

KEY TO THE PUPAE OF THE MOSQUITOES (DIPTERA: CULICIDAE) OF FLORIDA

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Abstract.—A key is presented for the known pupae of the mosquito species in Florida. This will complement the recent keys to adult females and fourth-instar larvae by Darsie and Morris. The pupal stage for all 78 species in Florida are known, except *Ochlerotatus condolezens* (Dyar and Knab). The sources for pupal descriptions are included.

Key Words: pupal key, mosquitoes, Florida

Of all the stages in the life cycle of mosquitoes, the pupa and possibly the male and its genitalia, are of least interest to practicing mosquito control agencies. Yet, the more stages that are known and can be identified the more complete will be the knowledge of the species encountered in a district. One problem that confronts those interested in pupal identification is the preparation of specimens for study. Whole pupae are not ordinarily used; instead the pupal exuviae are employed. They are usually prepared as part of an individual rearing when larval and pupal exuviae are associated with the emerged adults. The rearing technique is described by Darsie (1951).

Gradually a body of knowledge has accumulated in many taxonomic works describing the pupa along with the other stages from the fourth-instar larva to the adult. Sufficient descriptions have been published, in addition to my own unpublished work, to devise a key to the 78 species now known from Florida, except *Ochlerotatus condolezens* (Dyar and Knab), recently reported from Florida by Darsie (2003), whose larva and pupa are unknown. Major nomenclatural changes occurred when Reinert (2000) elevated *Ochlerotatus* Lynch

Arribáizaga to generic rank and Reinert et al. (2004), studying the tribe Aedini, further raised *Howardina* Theobald and *Stegomyia* Theobald to genus as well as other former subgenera and one new genus in the Nearctic Region not found in Florida.

Here is a list of the publications which contributed to formulating the keys: Arnell (1976), Barr (1963), Barr and Barr (1969), Belkin et al. (1970), Berlin (1969), Darsie (1949, 1951, 2001, 2003, 2005), Darsie and Day (2003), Floore et al. (1975), Lacey and Lake (1972), Reinert (1970a, b, c, d, e, f, g, 1971), Reinert et al. (1997), Zavortink (1968, 1972), Zavortink and O'Meara (1999).

MORPHOLOGY OF THE PUPAL EXUVIAE

It is customary to mount the pupal exuviae, for this, not the whole pupa, is used to study the pupal stage. The head capsule, prothorax, and mesothorax are closely united into the cephalothorax (CT), whereas the metathorax is reduced to a dorsal plate known as the metanotum. The scutum of the mesothorax is split longitudinally during eclosion, therefore the cephalothorax is mounted ventrally so that the external halves are uppermost after detaching the

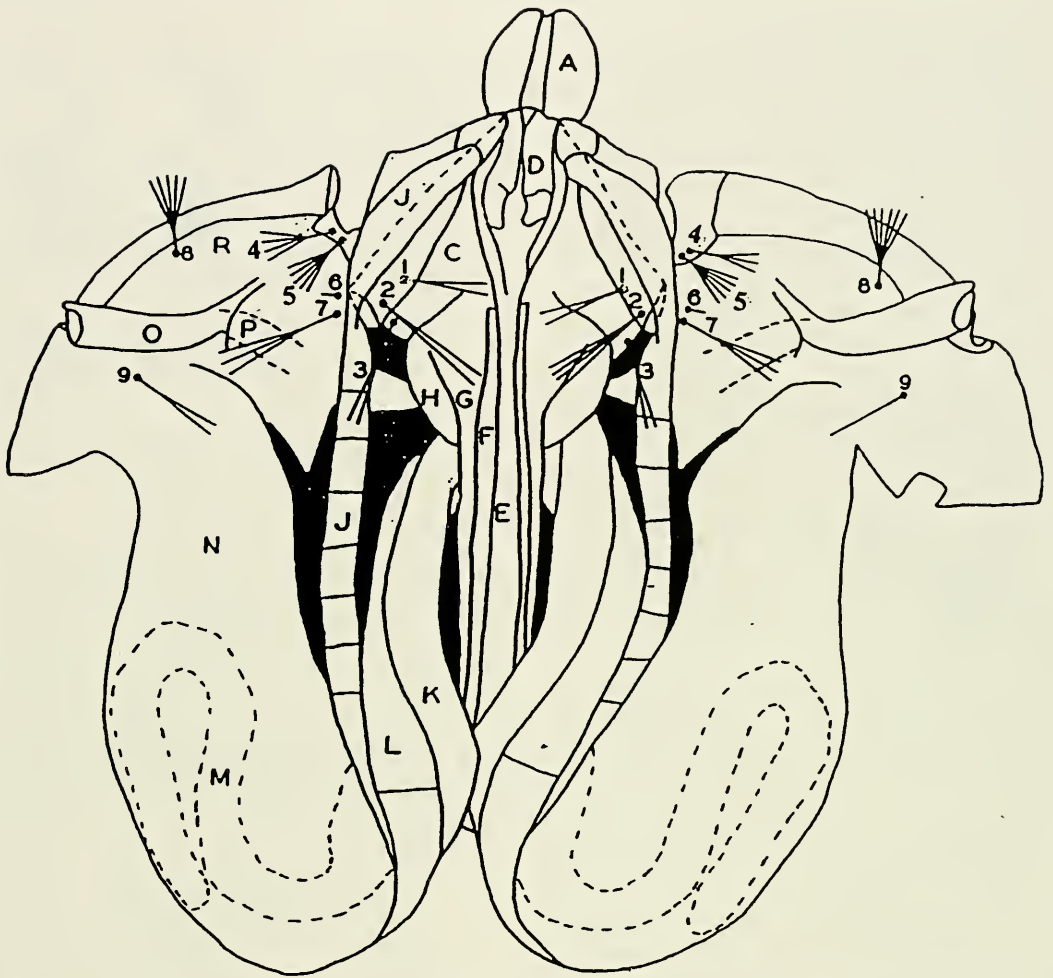


Fig. 1. Cephalothorax of pupal exuvium in slide mounted position. Abbreviations: A—dorsal apotome, C—lateralia, D—clypeus, E—labrum, F—mandible, G—maxilla, H—maxillary palpus, J—antenna, K—foreleg, L—midleg, M—hindleg, N—mesothoracic wing, O—trumpet, P—tracheal trunk, R—scutum.

metanotum and abdomen from the remainder of the cephalothorax. Hence, the mouthparts are located centrally, the halves of the scutum with the trumpets and the mesothoracic wings are lateral in position.

Head (Fig. 1): The dorsal apotome (A) is located anteromedially, attached to the clypeus (D) and the bases of the antennae (J). The labrum (E), fused basally with the clypeus, forms the central, long, narrow mouthpart. The mandibles (F), which border the labrum on each side, are also long and narrow, followed laterally by the maxillae (G), which are joined at the bases by

the maxillary palpi (H). The bases of the antennae lie in a fold which develops as a result of the cephalothorax being mounted ventrally and the long antennae are found lateral to the mouthparts. The lateralia (C) lie anteriorly, mesad to the antennal bases and are mainly located in the fold. The lateralia bear three rather prominent setae, 1,2,3-CT.

Thorax (Fig. 1): The pronotal sclerites are small and usually misshapen by the folding. Setae 4–7-CT are attached to this area. The largest sclerite of the cephalothorax is the scutum (R), split in half by eclo-

sion. The margin along the split is known as the median keel and a creaselike line parallel to the keel is the lateral line. The small, dorsomedial sclerite of the scutum bears an anterior angle. The scutum has setae 8,9-CT and a more or less cylindrical trumpet. The tubular portion is the meatus and the open, distal portion is the pinna. The base of the trumpet is connected to the tracheal trunks (P) of the respiratory system. The trumpet index is calculated by dividing the length of the organ by the width at midlength. Lateral to the mandibles and maxillae are the sclerites of the fore- and midlegs (K,L). Finally the mesothoracic wings (N) are posterior and sclerites of the hindlegs (M) are curled beneath them.

The metanotum consists of two rather quadrangular sclerites connected by a bridge. They cover the developing halteres and bear setae 10–12-CT.

Abdomen (Figs. 2–4): Abdominal segments I–VIII are more or less well developed. Segment I is without a sclerotized sternum and is modified by the presence of float hairs, seta 1-I. The terga and the sterna of segments II–VIII are well developed and consist of quadrangular sclerites adjoined by short intersegmental membranes. Posterior to segment VIII is a flap, segment IX, a genital pouch in which genitalia of the adult develop, and the paddle (Pa). The paddles are variously shaped, usually oval. Each is supported by an external buttress, a thickening along the basal 0.75 of the external margin, and a midrib, a similar thickening located medially. The external margin of the paddle sometimes bears short or long spicules or coarse denticles. The paddle index is calculated by dividing the paddle length by the greatest width.

Chaetotaxy of the abdomen: The present nomenclature for the abdominal setae follows Belkin (1962) and is shown in Figs. 2–4. Those studying older pupal literature will find it helpful to consult a table in Harbach and Knight (1980) comparing various past nomenclature with the one in Belkin (1962).

The keys to the pupae of the mosquitoes of Florida follow. The reader is referred to the Systematic Index of the Mosquitoes of Florida by Darsie and Morris (2003) for complete species detail. The keys were tested with pupae from the author's collection in which 60 of 78 species were available. For the other 18 species, descriptions and illustrations from the literature, except for *Oc. condolecens*, were employed (see literature citations above). I have three pupae of *Oc. canadensis mathesoni* Middlekauff from Camp Blanding, Clay County, Florida, collected on II-19–46. They are quite similar to the pupa of the typical subspecies.

Four illustrations are included to assist users of the key, namely, cephalothorax, Fig. 1; *Anopheles crucians* Wiedemann, Fig. 2; *Ochlerotatus sollicitans* (Walker), Fig. 3; and *Culex nigripalpus* Theobald, Fig. 4. Figures 2–4 represent the three major genera of mosquitoes in Florida and have the setae numbered. These three figures will help in dealing with the identification of minor genera.

KEYS TO THE PUPAE OF THE MOSQUITOES OF FLORIDA KEY TO GENERA

1. Seta 9-III–VI at or very near caudolateral angle of tergum, usually distinctly spiniform; meatus of trumpet deeply slit to near base *Anopheles*
- Seta 9-III–VI distinctly removed from caudolateral angle of tergum; meatus of trumpet usually split a short distance from pinna, if at all 2
- 2(1). Meatus of trumpet with distinct tracheoid extending considerable distance from base 3
- Meatus of trumpet without tracheoid or a faint tracheoid near base 7
- 3(2). Trumpet without pinna, apical process pointed, adapted for piercing plant tissue 4
- Trumpet with distinct open pinna 5
- 4(3). Seta 6-I–VI absent; paddle emarginate apically, with 2 equal lobes *Coquillettidia perturbans*
- Seta 6-I–VI present; paddle emarginate apically on inner margin only, outer lobe developed *Mansonia*
- 5(3). Seta 8-CT closer to base of trumpet than

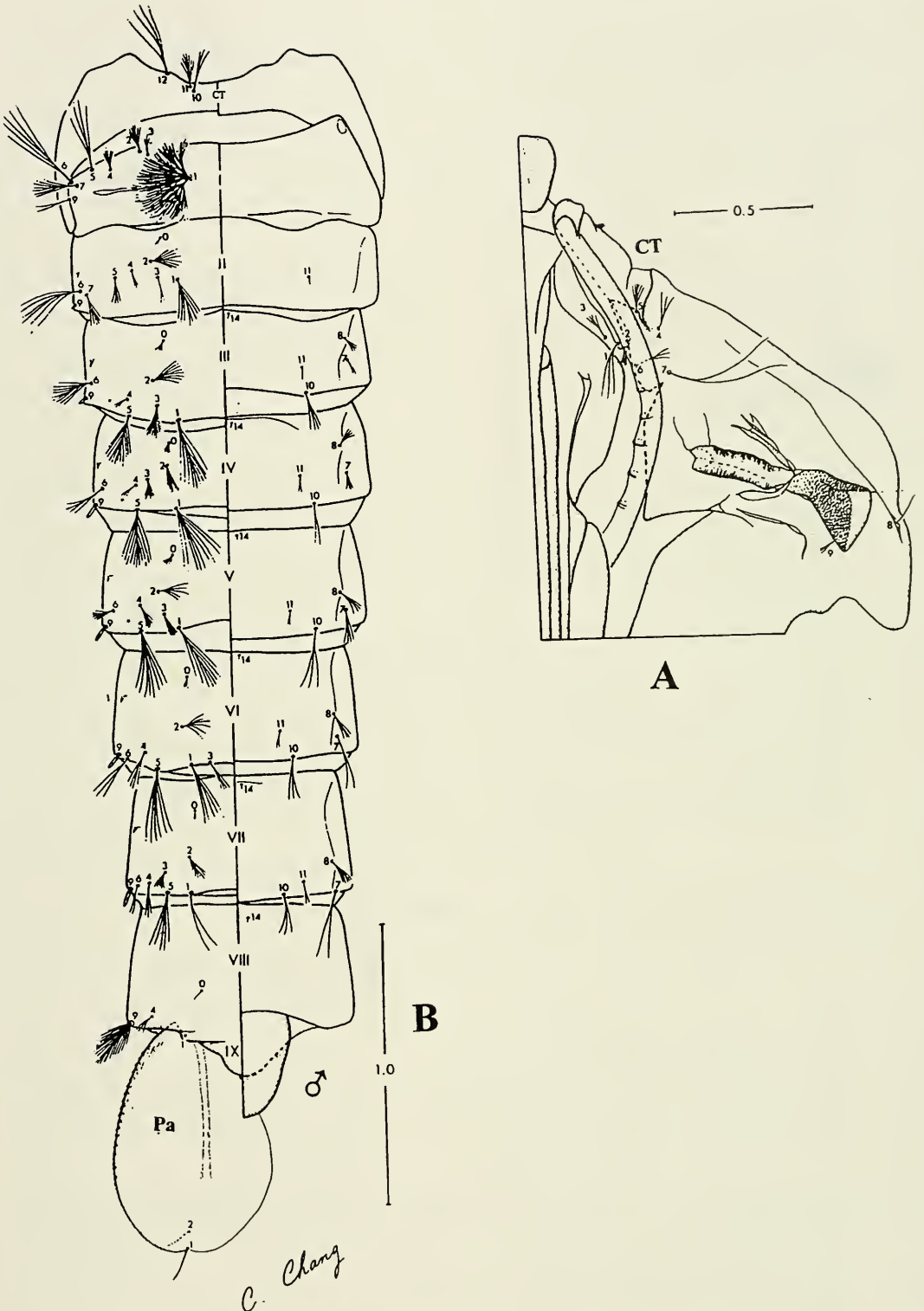


Fig. 2. Pupa of *Anopheles crucians*. A, Cephalothorax. B, Metanotum and abdomen, dorsal left, ventral right. Abbreviations: CT—cephalothorax, Pa—paddle.

- to seta 9-CT, at or near level of trumpet
..... *Uranotaenia*
- Seta 8-CT closer to seta 9-CT than to base
of trumpet, removed far caudad of trumpet
..... 6
- 6(5). Paddle with seta 1-P subequal to paddle
length *Deinocerites cancer*
- Paddle with seta 1-P much shorter than
paddle *Culex*
- 7(2). Anal segment with conspicuous cercal seta
1-X *Toxorhynchites r. rutilus*,
Toxorhynchites r. septentrionalis
- Cercal seta 1-X absent 8
- 8(7). Setae 9-VII,VIII subequal, both large with
numerous branches, paddle small, without
setae *Wyeomyia*
- Seta 9-VII rarely subequal to 9-VIII, both
with fewer branches; paddle normally with
at least one seta 9
- 9(8). Setae 8,9-CT in line perpendicular to
median keel; paddle without marked infusca-
tion near external buttress and apex ... 10
- Seta 8-CT usually distinctly more anterior
than 9-CT, if rarely the two setae in line
perpendicular to median keel, then paddle
with marked infuscation near external but-
tress and apex 11
- 10(9). Abdominal seta 1-VI lateral to setae 2,3-
VI *Culiseta*
- Abdominal seta 1-VI mesad of setae 2,3-
VI *Orthopodomyia*
- 11(9). Abdominal seta 5-II mesad of seta 4-II or
paddle deeply infuscated near external but-
tress and apex *Psorophora*
- Abdominal seta 5-II lateral of seta 4-II and
paddle not infuscate ... *Aedes*, *Ochlerotatus*,
Howardina, *Stegomyia*

KEY TO THE GENERA *Aedes* (*Ae.*),
Ochlerotatus (*Oc.*), *Howardina* (*Hw.*) AND
Stegomyia (*St.*)

- 1. Seta 6-CT long, stout, longer than seta 7-
CT 2
- Seta 6-CT short to moderately long, usu-
ally much shorter than seta 7-CT 3
- 2(1). Seta 9-VIII single; paddle with long, marginal
spicules *St. albopicta*
- Seta 9-VIII with 3-8 branches; paddle
margin with short, coarse spicules ...
..... *St. aegypti*
- 3(1). Seta 5-VII short, 0.3 or less length of fol-
lowing tergum 4
- Seta 5-VII moderately long to long, 0.5
or more length of following tergum .. 12
- 4(3). Anterior border of abdominal segment
VIII almost as wide as posterior border of
VII; paddle with margin smooth; seta 6-

- VII ventral and removed cephalad from
posterior border *Oc. fulvus pallens*
- Anterior border of segment VIII definitely
narrower than posterior border of VII;
posterior border paddle with marginal and
submarginal spicules; seta 6-VII dorsal
and near posterior margin 5
- 5(4). Seta 1-II with 14 or more branches; seta
6-VI single; paddle slightly emarginate
posteriorly 6
- Seta 1-II with 12 or fewer branches; seta
6-VI usually double or triple; paddle
evenly rounded posteriorly 7
- 6(5). Seta 1-III usually with 6 or more branch-
es; paddle as wide as long or nearly so,
with prominent marginal and sub margin-
al spicules, longer than diameter of 1-P
alveolus *Oc. taeniorhynchus*
- Seta 1-III with fewer than 6 branches;
paddle longer than wide, with marginal
and sub-marginal spicules usually smaller
than seta 1-P alveolus *Oc. scapularis*
- 7(5). Seta 5-IV-VI single, extremely long, long-
er than following tergum ... *Oc. dupreei*
- Seta 5-IV-VI usually double, never all
single, often no longer than following ter-
gum 8
- 8(7). Seta 3-I-III and 11-CT usually all single,
sum of all branches of the 8 setae no more
than 15 9
- Setae 3-I,II, 11-CT and usually 3-III with
2 or more branches, sum of all branches
of the 8 setae not less than 17 11
- 9(8). Seta 6-I subequal to seta 7-I or somewhat
shorter, about equal to median length of
tergum I *Oc. thelcter*
- Seta 6-I much longer than seta 7-I and the
median length of tergum I 10
- 10(9). Seta 6-III double; seta 12-CT usually
double *Oc. infirmatus*
- Seta 6-III usually single; seta 12-CT with
3 or more branches *Oc. tortilis*
- 11(8). Seta 6-CT with 3 or more branches; api-
cal margin of paddle spiculate
..... *Oc. tormentor*
- Seta 6-CT usually single; apical margin
of paddle without spicules .. *Oc. atlanticus*
- 12(3). Seta 1-VI and usually seta 1-V short, less
than 0.5 length of following tergum; seta
3-V usually single 13
- Seta 1-V,VI moderately long to long,
more than 0.5 length of following tergum;
seta 3-V usually double or multibranching
..... 15
- 13(12). Seta 1-IV usually 4- or 5-branched; seta
5-IV longer than tergum V *Oc. hendersoni*
- Seta 1-IV usually double or triple (2-4);

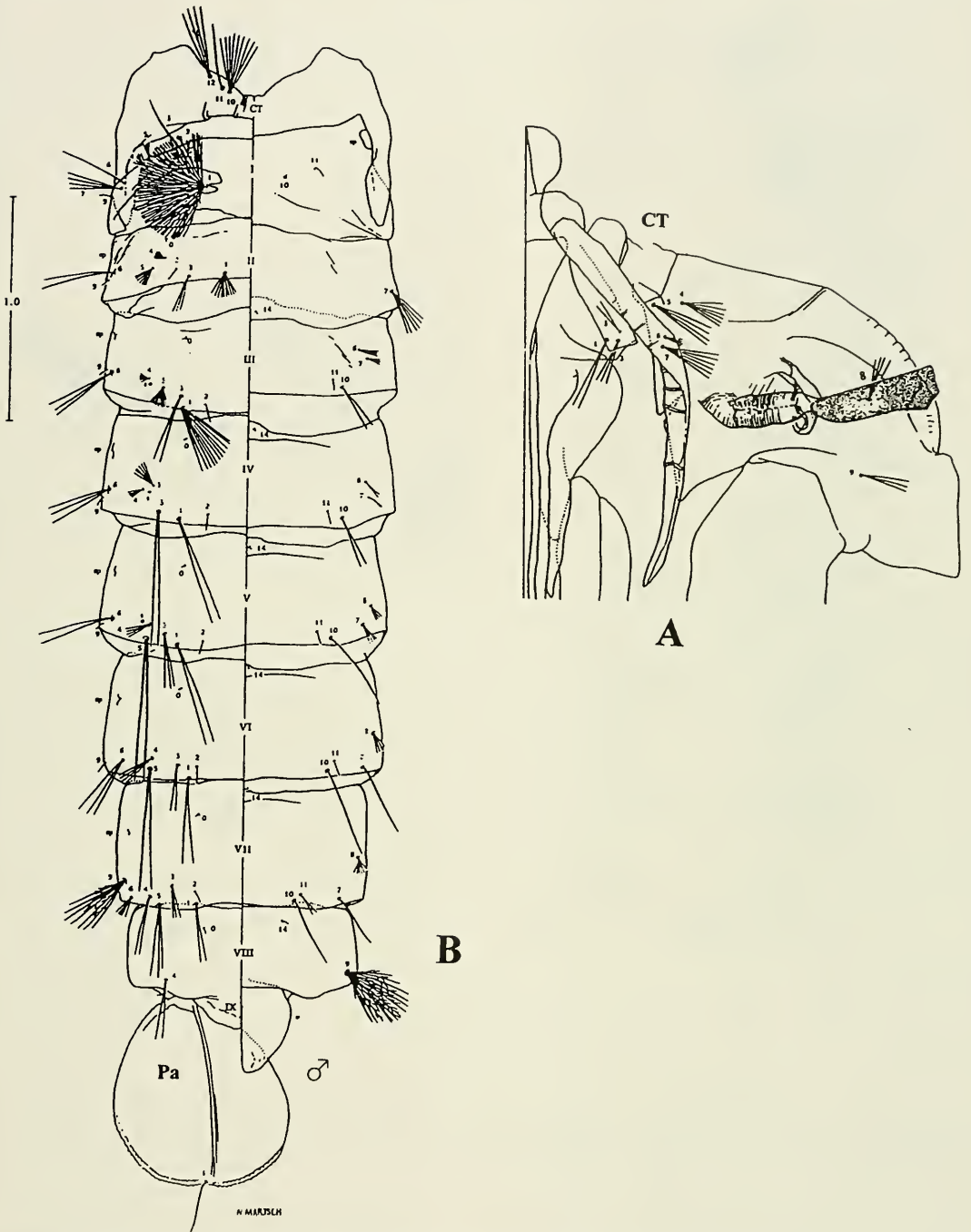


Fig. 3. Pupa of *Ochlerotatus sollicitans*. A, Cephalothorax. B, Metanotum and abdomen, dorsal left, ventral right. Abbreviations: CT—cephalothorax, Pa—paddle.

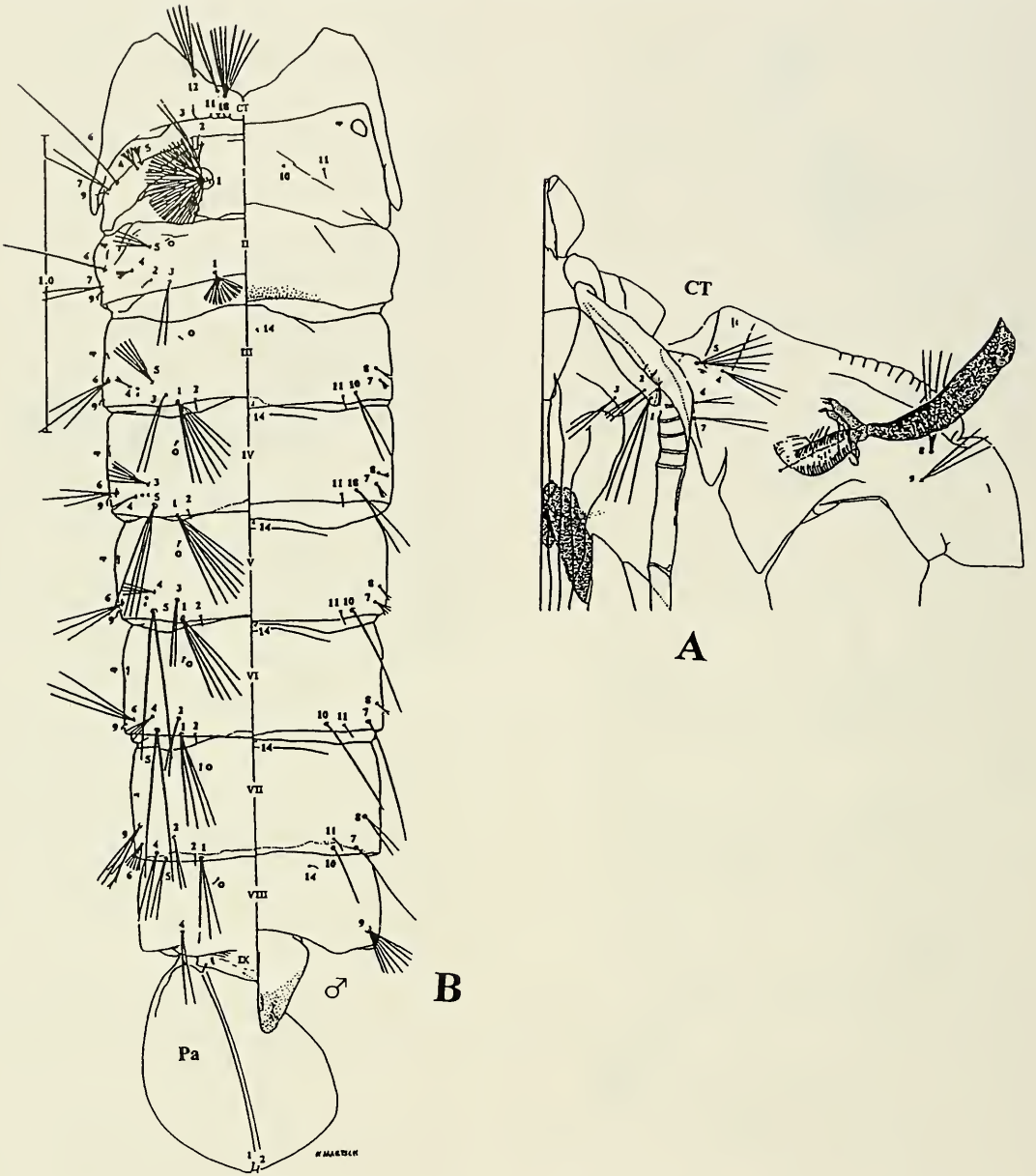


Fig. 4. Pupa of *Culex nigripalpus*. A, Cephalothorax. B, Metanotum and abdomen, dorsal left, ventral right. Abbreviations: CT—cephalothorax, Pa—paddle.

- | | | | |
|---|----|--|-------------------|
| seta 5-IV usually shorter than tergum V | 14 | single; seta 3-VII with 4 or more branches | <i>Ae. vexans</i> |
| 14(13). Seta 6-I single; seta 7-I usually double; | | – Sternum II without apical spicules; seta | |
| seta 9-VIII usually with fewer than 7 | | 3-I usually with 2 or more branches; seta | |
| branches | | 3-VII usually double or single | 16 |
| – Seta 6-I usually double; seta 7-I usually | | 16(15). Seta 1-V and usually seta 1-VI much longer | |
| triple; seta 9-VIII usually with more than | | and stouter than any other setae on | |
| 8 branches | | tergum, except seta 5 and sometimes seta | |
| 15(12). Sternum II with apical spicules; seta 3-I | | 10, V-VI | 17 |

- Seta 1-V,VI only slightly stouter and usually only slightly longer than any other seta on tergum, except seta 5 and sometimes seta 10-V,VI, if at all 19
- 17(16). Seta 5-IV-VI shorter than following tergum; seta 1-VI usually triple *Oc. mitchellae*
- Seta 5-IV-VI as long as or longer than following tergum; seta 1-VI usually single 18
- 18(17). Seta 9-VII with 5 or more branches *Oc. sollicitans*
- Seta 9-VII with 3 or fewer branches *Oc. c. canadensis, Oc. c. mathesoni*
- 19(16). Seta 1-IV,V longer than following tergum *Oc. sicticus*
- Seta 1-IV,V not as long as following tergum 20
- 20(19). Seta 3-II,III and 5-IV-VI almost invariably single; seta 5-IV occasionally double or triple; seta 9-VIII single, rarely double *Ae. cinereus*
- Seta 3-II,III and 5-IV-VI never all single; seta 9-VIII usually with 3 or more branches *Oc. thibaulti*

KEY TO THE GENUS *ANOPHELES*

- 1. Abdominal setae all very short, 1-IV-VI 0.2 length of following tergum *barberi*
- Abdominal setae long and short, 1-IV-VI at least 0.5 length of following tergum 2
- 2(1). Seta 9-VIII usually single, rarely forked apically; seta 1-IV-VII all single and about as long as following tergum *albimanus*
- Seta 9-VIII with thickened shaft and many lateral branches; seta 1-IV-VII usually all branched and shorter than following tergum 3
- 3(2). Paddle with coarse, blunt teeth on external margin *walkeri*
- Paddle without coarse teeth on external margin 4
- 4(3). Seta 2-V usually with 4-6 branches; seta 0-V with 2-11 branches, rarely single; seta 11-CT usually with 6 branches 5
- Seta 2-V usually single to triple; seta 0-V single seldom double; seta 11-CT usually with 3-5 branches 7
- 5(4). Seta 0-IV large, usually with 2-5 branches; seta 0-V large, with 3-11 branches *crucians*
- Seta 0-IV,V small, single or double, rarely triple 6
- 6(5). Seta 1,5-IV with 5-10 branches, usually with 5,6 branches; seta 1-V and 5-VI with 3-8 branches; seta 5-V with 3-5 branches *bradleyi*

- Seta 1-IV with 9-14 branches; seta 1-V with 6-10 branches; seta 5-IV with 12-17 branches; seta 5-V with 8-16 branches; seta 5-VI with 9-13 branches *georgianus*
- 7(4). Seta 6-V double or triple; seta 8-CT usually double or triple 8
- Seta 6-V and seta 8-CT single, seldom double 13
- 8(7). Seta 9-I single, seldom double; length of seta 9-VII usually 7.0 or greater than basal width *atropos*
- Seta 9-I usually with 2 or more branches; length of seta 9-VII usually 6.8 or less than basal width (*quadrifaculatus* complex) 9
- 9(8). Dorsal apotome with well developed median apical projection; scutum with anterior angle broad, approximately 90° *maverlius*
- Dorsal apotome without apical projection; scutum with anterior angle acute 10
- 10(9). Cephalothorax with lateral line on median keel long, extending posteriorly to seta 8-CT; cephalothorax with postscutal area split by dorsal ecdysial opening; seta 1-VII usually slightly longer than length of tergum VIII 11
- Cephalothorax with lateral line of median keel short, extending posteriorly only to trumpet base; cephalothorax with postscutal area intact; seta 1-VII usually 0.75 or less length of tergum VIII 12
- 11(10). Sum of branches for both setae 1-P usually 4-12; seta 1-P usually with 2-6 branches; sum of both setae 9-VIII usually 24-48 *quadrifaculatus* ss
- Sum of branches for both seta 1-P usually 2,3; seta 1-P usually single; sum of branches for both setae 9-VIII usually 12-23 *smaragdinus*
- 12(10). Sum of branches for both setae 10-CT usually 2-5; distribution limited to part of Florida *diluvisalis*
- Sum of branches for both setae 10-CT usually 6-11; distribution in at least 3 states of USA *inundatus*
- 13(7). Seta 6-I single to triple; seta 9-IV 0.67 or more length of seta 9-V *punctipennis*
- Seta 6-I with 5 or more branches; seta 9-IV 0.63 or less length of 9-V *grabhamii*

KEY TO THE GENUS *CULEX*

- 1. Seta 5-CT very long, about 5.0 length of seta 4-CT; abdominal tergum VIII with posterior lobe overlying lateral part of tergum IX; seta 1-IX absent (subgenus *Micraedes*) *biscaynensis*

- Seta 5-CT no more than 2.0 length of seta 4-CT; abdominal tergum VIII with posterior lobe not overlying lateral part of tergum IX; seta 1-IX present 2
- 2(1). Meatus of trumpet with narrow slit extending from proximal part of pinna; seta 2-VI usually lateral of seta 1-VI (subgenus *Melanoconion*) 3
- Meatus of trumpet without narrow slit extending from proximal part of pinna; seta 2-VI mesad of seta 1-VI 9
- 3(2). Seta 9-VIII very near posterolateral corner; posterolateral corner of segment VIII gently rounded *cedecei*
- Seta 9-VIII distinctly removed from posterolateral corner; posterolateral corner of segment VIII with distinct point 4
- 4(3). Seta 5-V double or triple and nearly as long as following tergum 5
- Seta 5-V usually with at least 4 branches, if fewer, then distinctly shorter than following tergum 6
- 5(4). Seta 1-II with 14 or fewer branches; pinna of trumpet, including slit, less than 0.3 of total trumpet length *pilosus*
- Seta 1-II with 25 or more branches; pinna of trumpet including slit 0.4-0.5 of total trumpet length *erraticus*
- 6(4). Seta 6-IV,V at least 4-branched; seta 5-V usually 5-branched; trumpet index usually greater than 8.5 *atratus*
- Seta 6-IV,V usually triple; seta 5-V usually 4-branched; trumpet index about 8.0 7
- 7(6). Pinna including slit about 0.35 length of trumpet; seta 8-CT single *mulrennani*
- Pinna including slit about 0.4 length of trumpet; seta 8-CT with 3 or more branches 8
- 8(7). Trumpet lighter between apex of tracheoid and base of pinna, flared apically *iolambdis*
- Trumpet uniformly dark distal to apex of tracheoid and base of pinna, if lighter, then remainder of trumpet also lighter, not flared apically *peccator*
- 9(2). Trumpet index 7.7; seta 9-VII usually double; seta 9-VIII usually 4-branched (subgenus *Neoculex*) *territans*
- Trumpet index about 7.0; seta 9-VII usually with 4 or more branches; seta 9-VIII usually 6-branched or more (subgenus *Culex*) 10
- 10(9). Abdominal tergum I with distinct short spicules posterior *bahamensis*
- Abdominal tergum I without short spicules posterior 11

- 11(10). Seta 2-P absent on paddle; seta 1,6-VI usually double *restuans*
- Seta 2-P present, rarely absent; seta 1,6-VI usually with 3 or more branches 12
- 12(11). Trumpet index about 5.0; seta 1-VII usually with 4 or more branches *quinquefasciatus*
- Trumpet index 5.5 or more; seta 1-VII usually double or triple 13
- 13(12). Seta 1-II with 16 or more branches 14
- Seta 1-II with 15 or fewer branches 15
- 14(13). Posterior border of abdominal sternum II with short, sharp spicules; seta 5-IV-VI shorter than following tergum *nigripalpus*
- Posterior border of abdominal sternum II without spicules; seta 5-IV-VI longer than following tergum *declarator*
- 15(13). Trumpet index about 7.0; pinna short, about 0.13 of total trumpet length *salinarius*
- Trumpet length about 6.0; pinna longer, about 0.16 of total trumpet length *tarsalis*

KEY TO THE GENUS *CULISETA*

- 1. Seta 2-P present; meatus of trumpet with narrow slit extending from proximal part of pinna almost to base; seta 2-II longer than seta 3-II *melanura*
- Seta 2-P absent; pinna of trumpet without slit; seta 2-II usually much shorter than seta 3-II *inornata*

KEY TO THE GENUS *MANSONIA*

- 1. Trumpet broad, index about 6.0; paddle moderately broad, index about 2.5 *titillans*
- Trumpet slender, index about 10.0; paddle narrow, index more than 3.0 *dyari*

KEY TO THE GENUS *ORTHOPODOMYIA*

- 1. Seta 2-II-VI 0.4-0.6 length of seta 1-II-VI; seta 5-III longer and stronger than seta 3-III; setae 6,7-I weakly developed *alba*
- Seta 2-II-VI less than 0.3 length of seta 1-II-VI; seta 5-III not as long nor as strong as seta 3-III; setae 6,7-I long, strong *signifera*

KEY TO THE GENUS *PSOROPHORA*

- 1. Posterolateral corner of abdominal segment IV with large spines; seta 2-P usually absent (subgenus *Janthinosoma*) 2
- Posterolateral corner of IV without large spines; seta 2-P usually present, sometimes indistinct 5
- 2(1). Seta 10-CT with 3 or fewer branches; seta 5-II usually with 4 or fewer branches; seta 1-III usually with 6 or fewer branches *mathesoni*

- Seta 10-CT and seta 5-II usually with 5 or more branches; seta 1-III usually with 7 or more branches 3
- 3(2). Heavily pigmented, appears brown, not yellow; trumpet index less than 3.0; seta 12-CT usually with 5 or more branches *johnstonii*
- Lightly pigmented, appears yellow; trumpet index 3.0-4.0; seta 12-CT usually with 4 or fewer branches (except *horrida*) 4
- 4(3). Seta 12-CT single or double; seta 4-I,II with 4 or fewer branches *ferox*
- Seta 12-CT and 4-I,II usually with 4 or more branches *horrida*
- 5(1). Seta 4 closer to seta 5 than to seta 1 on abdominal segment III, usually anterior to and subequal to seta 5; seta 5-II,III usually with 3 or fewer branches; seta 9-VIII usually with 5 or fewer principal branches; pupa large (subgenus *Psorophora*) 6
- Seta 4 closer to seta 1 than to seta 5 on III, seta 4 usually posterior to and much longer than seta 5; seta 5-II,III usually with 4 or more branches; seta 9-VIII usually with 6 or more principal branches; pupa medium or small 7
- 6(5). Abdominal segment VIII with dark spots anteriorly and posteriorly on either side of midline, segment usually spotted; without dark median stripe on abdomen; with diagonal stripes enclosing conspicuous light areas laterally on segment VII *howardii*
- Abdominal segment VIII without dark spots anteriorly and posteriorly, but usually with darker median stripe, segment usually rather evenly dark laterally and on midline, with light pigmentation elsewhere; with dark median stripe on abdomen; without pattern as above but with diagonal stripes laterally on segments V-VII *ciliata*
- 7(5). Seta 2-P usually absent; seta 11-CT usually with 3 or more branches; seta 4-I usually with 6 or more branches *cyanescens*
- Seta 2-P usually present; seta 11-CT usually single, occasionally double; seta 4-I usually with 4 or fewer branches (subgenus *Grabhamia*) 8
- 8(7). Seta 5-I with 4 or fewer branches; seta 7-I with 5 or more branches; seta 6-III,IV and 1-VI with 3 or more branches *pygmaea*
- Seta 5-I with 5 or more branches; seta 7-I with 4 or fewer branches; setae 6-III, 1-VI, and 6-IV usually single or double 9
- 9(8). Seta 1-P very long, 0.25 length of paddle; seta 1-VII usually placed about midway between lateral border and middorsal line of tergum *discolor*
- Seta 1-P usually about 0.16 length of pad-

dle; seta 1-VII usually much closer to mid-dorsal line than to lateral border of tergum *columbiae*

KEY TO THE GENUS *URANOETAENIA*

- 1. Trumpet index about 11.0 or more; seta 11-CT usually double or triple *sapphurina*
- Trumpet index less than 7.0; seta 11-CT usually single *lowii*

KEY TO THE GENUS *WYEOMYIA*

- 1. Paddle fringed with long, filamentous spicules on outer and apical 0.2 of inner margin; seta 4-VIII less than 0.2 length of paddle *mitchellii*
- Paddle spicules short; seta 4-VIII 0.5 length of paddle 2
- 2(1). Seta 2 contiguous with seta 1 on abdominal segment VII; paddle index 1.5 *smithii*
- Seta 2 far removed from seta 1 on VII; paddle index usually greater than 1.5 *vanduzeei*

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